AD-A177-900 REQUIRED OPERATIONAL CAPABILITY (ROC) NO CCC 120C FOR THE TACTICAL AIR OP.. (U) MARINE CORPS WASHINGTON DC F X CHAMBERS 09 FEB 87 1/2

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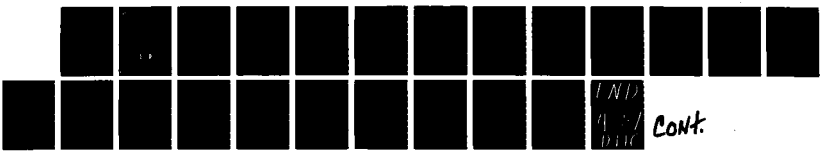

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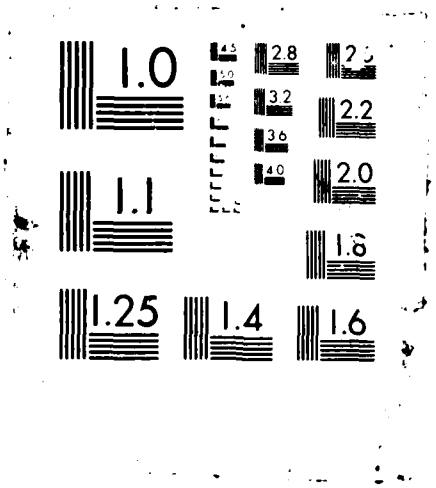
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DEPARTMENT OF THE NAVY
HEADQUARTERS UNITED STATES MARINE CORPS
WASHINGTON, D.C. 20380-0001

IN REPLY REFER TO
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9 FEB 1987

AD-A177 980

From: Commandant of the Marine Corps

Subj: REVISED REQUIRED OPERATIONAL CAPABILITY (ROC) NO. CCC 1.28C FOR THE TACTICAL AIR OPERATIONS MODULE

Ref: (a) MCO 3900.4C

Encl: (1) ROC No. CCC 1.28C for the Tactical Air Operations Module

1. In accordance with the procedures set forth in the reference, the revised ROC for the Tactical Air Operations Module (TAOM) (CCC 1.28C) is hereby established and promulgated.

2. The Commanding General, Marine Corps Development and Education Command (Director, Development Center), Quantico, Virginia 22134 is the Marine Corps point of contact for any questions pertaining to this ROC and any development efforts pertaining thereto.

F X CHAMBERS, JR.
Colonel U. S. Marine Corps
Asst. Deputy Chief of Staff for RD&S

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(6) Increased electronic warfare and electronic countermeasures such as jamming and intrusion.

(7) Exploitation by enemy signal intelligence and electronic support measures systems.

b. Operational Deficiency. The present tactical air operations center (TAOC) and the doctrine under which it is employed are based on operational concepts and technology of the 1950's and 1960's. The ITAOC and TDCC will be obsolete and unsupportable by 1990. TAOC deficient equipment includes the ITAOC, the TDCC and associated sensor and ancillary equipment. In particular, the operational and employment concepts dictated by the nature of equipment forming the TAOC possess certain tactical limitations.

(1) Mobility and Flexibility. Current facilities do not possess either the mobility or modular capability necessary to structure the system to provide support commensurate with the size and composition of all MAGTF organizations and air threat intensity levels.

(2) Air Command and Control Capability. Existing operational elements, as currently configured, lack sufficient capability to counter the advanced threat discussed in paragragh 2a. above. Although the TAOM development program is limited to replacing the existing ITAOC and TDCC, and will not encompass sensor development or weapons limitations, it must possess the capability to fully exploit the capabilities of sensors and weapons in existence during its lifetime.

(3) Operational Compatibility. System compatibility and functional interoperability between those systems listed in paragraph 5 is required. The current ITAOC and TDCC will not satisfy this requirement in the future.

(4) Maintenance Requirements. Equipment complexity and lack of commonality within the Marine Air Command and Control System (MACCS) elements impose an unacceptable cost of ownership burden by requiring myriad identified hard skill personnel in large quantities and necessitating a complex and significant logistic and maintenance support system.

(5) Degraded Operations. The existing TAOC does not possess the capability to degrade without a significant loss of functional capability and capacity.

3. OPERATIONAL AND ORGANIZATIONAL CONCEPTS. The Marine Corps tactical systems (MTS) developments and the MACCS operational deficiencies dictate system engineering of the air command and control concept in correcting the operational deficiencies identified in countering the anticipated 1990 air threat. The Marine air/ground team philosophy requires the identification of an air command and control system responsive not only to that philosophy but also to the full range of MAGTF environments of

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REQUIRED OPERATIONAL CAPABILITY FOR TACTICAL AIR OPERATIONS MODULE (TAOM), AN/TYQ-23V(1)

1. STATEMENT OF THE REQUIREMENT. The command and control of tactical air operations for a Marine air-ground task force (MAGTF) in circa 1990-2000 will require a system capable of operating in an environment significantly more complex and demanding than that which has existed in past conflicts. Changes in the required operational capability for the air command and control system have resulted from the application of new technology to weapon systems of potential adversaries and evolving tactical systems concepts within the Marine Corps. The requirement to replace the Improved Tactical Air Operations Central (ITAOC) (AN/TYQ-2), Tactical Data Communications Central (TDCC) (AN/TYQ-3A), and associated pieces of equipment within the Marine air control squadron (MACS) has been identified. The decision to replace these systems was based on a review of the postulated 1990 threat, current operational deficiencies and equipment obsolescence. An initial operational capability (IOC) date of FY90 and a full operational capability (FOC) date of FY92 is required.

2. THREAT AND OPERATIONAL DEFICIENCY

a. Threat. The major threat to Fleet Marine Forces in the 1990-2000 time frame will be that described in the Marine Corps Long-Range Plan (MLRP); and paragraph III of the General Operational Requirement for Command, Control, and Communications (GOR-CCC-1). The specific elements of the 1990-2000 threat affecting the required operational capability of command, control, and air defense facilities are those operational concepts and weapons system characteristics identified below:

(1) Total altitude spectrum air threat (i.e., air targets employing terrain-following techniques (e.g., cruise missiles) to high altitude targets with steep dive angles).

(2) High speed and small radar cross-section targets.

(3) Long range air targets with extended stand-off launch capability for air-to-surface missiles.

(4) Saturation techniques using strike aircraft, remotely piloted vehicles (RPV's), and missiles.

(5) Antiradiation missiles (ARM's) targeted for radar installations.

1990-2000. This program will develop the TAOM, AN/TYQ-23, a component of the TAOC. It will not develop the sensors and associated communications devices. The TAOC is an operational element of the MACCS designed for specified air space management and control of air defense operations. It is a collection of personnel, procedures, and equipment to accomplish specified air command and control functions. Equipment comprising the current TAOC includes sensors, communications, power sources, and the command and control equipment currently provided by the AN/TYQ-2 and the AN/TYQ-3A. Within the MAGTF airspace, the TAOC performs the following functions:

a. Identify and classify all aircraft and missiles detected by organic sensors within its sector of responsiblity.

b. Maintain tracks on identified contacts, providing enroute control/navigational assistance as required.

c. Provide for data interface between adjacent and higher air defense agencies including appropriate agencies external to MACCS.

d. Evaluate enemy air threats.

e. Select and assign weapons to counter enemy air threats.

f. Control the engagement of enemy air threats by interceptor or surface-to-air missiles.

g. Coordinate and execute electronic counter-countermeasures (ECCM) and emission control (EMCON) conditions set by higher headquarters.

h. Perform specified airspace management to include:

(1) Control of air support and reconnaissance missions as required.

(2) Assist in search and rescue operations.

(3) Provide limited air traffic control services, as required.

i. Be capable of performing limited TACC functions should the actual TACC become a casualty.

j. Coordinate with low altitude air defense (LAAD) units.

4. TAOM ESSENTIAL CHARACTERISTICS

a. General. The TAOM development program will provide the TAOC with TAOM's to include both hardware and software. The TAOC must function in concert with other agencies to provide responsive, real-time control of all MAGTF air assets in the accomplishment of air defense and air traffic control

functions. It must provide the versatility to permit the tactical air commander (TAC) to rapidly deploy the air control capability required by friendly and enemy air situations. This implies the capability to build up or scale down the operational capability of these agencies by augmenting, reconfiguring, or reducing the TAOM's in a modular way, without disruption of air control operations. In addition, because of high intensity Marine Corps operations, TAOM's must be reliable, redundant, maintainable, and modular in order to provide a high degree of system availability and to permit control functions to degrade gracefully (not catastrophically) in the face of equipment losses due to malfunctions or enemy actions. TAOM's must provide the TAOC with the capability to operate with Navy, Army, Air Force, and other air command and control systems.

b. Tactical Air Operations Module Description. The unique characteristic of the TAOM is its modularity. By judiciously combining TAOM's, sensors, air defense weapons, and communications equipment, an air defense/air control capability is provided for all levels of the MAGTF to counter the anticipated air threat and support air operations. The TAOM has the capability to perform automated air defense/air control and data exchange and processing. A TAOM is capable of independent operation but can be interconnected with other TAOM's as required. A single TAOM shall be capable of providing the TAC with a limited air defense/air control capability while other TAOC elements pass ashore or displace by echelon in support of a MAGTF. Yet, a minimum of two TAOM's should be interconnected to create a functional TAOC that contains sufficient operator positions and provides system capacities required to support MAB/MAF level employment.

(1) Functional Characteristics. The TAOM will provide the following:

(a) Automatic data processing to include acquisition, correlation, and tracking of targets from radar inputs and external agencies, air tasking allocation orders, air traffic control functions, threat evaluation and weapons assignment processing, surveillance processing, and automatic reconfiguration after a component failure.

(b) Real-time data exchange to allow each TAOM to access the data in any of the other collocated TAOM's in the TAOC.

(c) Real-time data exchange, to allow access to selected data held by all TAOM's in the TAOC with other TAOM's not located at the TAOC.

(d) ECCM and passive electronic countermeasure (ECM) capabilities adequate to cope with the anticipated threat.

(e) Real-time displays to support supervisory tasks, weapons control, track coordination, ECCM, and system control.

(f) Performance monitoring, fault isolation, and system configuration management control.

(g) Communications and communications security.

(h) Digital data exchange with other command and control agencies and weapon systems.

(i) Digital interfaces with at least two sensors and associated decoys, which may be either local or remote.

(j) The capability to operate with standard military and civilian prime power sources.

(k) Operational software programs such that operator personnel can start, configure and terminate system operation. All operational programs will be stored in a permanent nonvolatile medium.

(2) Physical Characteristics. The TAOM will be packaged in a standard Marine Corps shelter and will be transportable by all standard tactical means including helicopter, truck, ship, and fixed wing aircraft. It must be capable of operating from a stationary truck. The TAOM includes:

(a) Operator console units (OCU's) with real-time and static visual displays.

(b) Data processors, mass storage devices and attendant software to support automation.

(c) Input/output control equipment and units.

(d) Digital message exchange equipment.

(e) Communications and communications security equipment.

(f) Radar/IFF interface equipment.

(g) Environmental control units (ECU's) and chemical, biological and radiation (CBR) protective equipment.

(h) Prime power interface equipment.

(i) Physical storage facilities for spares.

(j) Capability to transition from a transport mode to an operational mode within 15 minutes. Operational capability is achieved when the TAOM is electrically powered and functional.

(k) Manually initiated nonexplosive destruction of the TAOM, including COMSEC and computer equipment and all associated files.

(l) The TAOM equipment must be designed so that Marines can operate and maintain it. The equipment should not require any additional personnel above the present level required for operation and maintenance of the existing TAOC/TDCC equipment without the identification of compensatory reductions. Additionally, the present skill level requirements should be maintained unless prior approval is received from the Manpower Department.

(3) Operational Employment. The inherent versatility of the modular TAOM concept provides the TAC with full functional capability during all phases of an amphibious operation. Normally, two TAOM's will be required to establish the TAOC, and additional TAOM's increase the number of sensor interfaces, operator positions, computers, and air-to-air ground controlled interceptions. This versatility allows the TAC to disperse the TAOM's for survivability and improved radar coverage. Since each TAOM has the same functional capability, graceful degradation is built into the TAOC under any situation where multiple TAOM's are employed. Where multiple TAOM's are employed, no functional capability would be lost when echeloning forward; only a reduced capacity would result during the movement of TAOM's. A single TAOM shall be capable of stand-alone employment that functionally provides all TAOC capabilities. The limitation that is inherent in single-OM employment would be loss of redundancy and capacity.

(4) Organizational Considerations. The operational concept of the MACCS and tactical employment of the TAOM is independent of Marine aircraft wing (MAW) and division organizational structure. The MACCS and TAOM employment retain the proven concept of centralized command and decentralized control, yet have the versatility to be totally responsive in circumstances wherein stringent rules of engagement dictate otherwise. The current MACS employs those equipment groupings as the central element of a TAOC. The operational requirement exists for the MAW to possess the capability to deploy two fixed-size TAOC's. Accordingly, the notional MAW and its Marine air control group (MACG) organizationally consist of two MACS's. Due to the requirement to support two independent MAB's or a MAF in the future and the resultant flexible design of the TAOM's, each of the two MACS's will be equipped with four TAOM's. A single TAOM shall be capable of stand-alone employment that functionally provides all TAOC capabilities. The limitation that is inherent in single-OM employment would be loss of redundancy and capacity.

(5) TAOM Procurement and Distribution. Initial estimates indicate four TAOM's per active and reserve MACS, eight for the Marine Corps Communication Electronics School (MCCES), four for the Marine Tactical System Support Activity (MCTSSA), and four for maintenance float (MCLB Barstow), total of [illegible].

c. Shelter. The TAOM will be housed in standard expeditionary shelters. The TAOM shelter will be equipped with lift and tie-down devices and appropriate forklift receptacles.

d. Transport Mode. The TAOM will be transport capable by railroad, truck, ship, and rotary and fixed-wing aircraft. Specifically, the TAOM will be capable of: (1) transport over rough terrain aboard organic Marine Corps trucking, (2) helicopter lift externally by the CH-53E, (3) transport in appropriate amphibious shipping, and (4) on/off load from prime movers by materiel handling equipment (MHE) organic to the Fleet Marine Force.

e. Power Requirements. The TAOM must be operable by power sources aboard ship, in garrison (i.e., both U.S. and European commercial power), and from standard Marine Corps field power generating equipment. The use of direct current (DC) sources must be considered where applicable. Design goals include:

(1) Internal circuitry isolation from power anomalies and disruptions which may result in component destruction.

(2) A capability to utilize an alternate power source. This function need not, but can, be automatic.

(3) The capability to operate within the full range of frequency and voltage provided by ships, commercial power, and standard Marine Corps field power generating equipment projected for the 1990-2000 time frame.

f. Environmental Conditions. The electronic equipment of the TAOM shall be designed to meet the class 4 requirements of MIL-E-16400. The overall TAOM shall meet the requirements for class 1 equipment of that same specification. Environmental controls (heating and air conditioning) will be provided for personnel comfort only. In addition, it must meet the requirements of the current standard/specification for this type of equipment for the following conditions/environment:

(1) "Red-black" criteria.

(2) Electromagnetic interference (EMI) and electromagnetic compatibility (EMC).

(3) Climate.

(a) Sand and Dust. The equipment shall operate in wind blown sand and dust typical of a desert area.

(b) Salt Spray and Fog. The equipment shall be able to operate in salt spray and fog typical of amphibious operations.

(c) Rainfall. The equipment shall operate in a heavy rainfall.

(4) The TAOM will survive and operate with no degradation under the conditions listed in MIL-E-16400 and shall operate at any angle up to 10 degrees from the horizontal position.

g. Interoperability. The TAOM must be interoperable with other Marine Corps command/control systems and air control facilities as well as systems of other services, as appropriate.

h. Safety. The TAOM equipment must be designed to minimize the possibility of injury to operator and maintenanc personnel. All applicable requirements of MIL-STD-454 and MIL-STD-1472 must be met.

i. Survivability

(1) The TAOM equipment must be operable in the vicinity of artillery and other high concussion weapons. Nuclear hardening is not applicable, but the equipment must survive the flash effects of nuclear explosions to the same extent as protectively garmented human operators. Maximum protection feasible against electromagnetic radiation must be provided for electronic components and storage devices. CBR protection must be provided for the personnel and equipment.

(2) The TAOM components must be capable of reliable operation in the electromagnetic environment anticipated for the 1990 battlefield, to include enemy electronic warfare (EW) and ECM.

(3) The system design must include features which will minimize the effectiveness of enemy ARM's, without disruption of normal operations.

(4) Countersurveillance techniques will be incorporated to the maximum extent feasible.

j. Reliability, Availability, and Maintainability

(1) Reliability and Availability. System design and construction must be sufficient to ensure that the TAOC meets those reliability and availability criteria contained in annex A. The single mission duration for the TAOC is 24 hours. While deployed, the TAOC must be supportable for a sustained period of 30 days.

(2) Maintainability. The maintenance concept for the TAOM and any other equipment developed under the TAOM program is based on the following:

(a) A minimum number of components, modules, and subsystems will be used to fulfill the essential functional requirements of the equipment suites.

(b) There will be maximum feasible use of common subsystems and modules between TAOM and other systems.

(c) Organizational maintenance procedures will permit rapid identification, isolation and correction of 95 percent of all cases of electronic component failure by replacement of malfunctioning components with a mean time of 15 minutes, not to exceed a maximum of 30 minutes. These procedures will use built-in-self-test features and must be performed on-line without disrupting normal operations. Maintenance test procedures will identify the item to be replaced. Adequate spares must be maintained at the organizational level to sustain operations for 30 days at the specified level of availability.

(d) Organizational maintenance must be performed without the need for special tools or test equipment. Intermediate and depot level maintenance may require special tools or test equipment.

(e) Electronic module design must be such that minimal calibrating adjustments are required at the organizational level. If adjustments are required, they must be accomplished simply and rapidly without the use of special purpose tools or precision instruments.

(f) Preventive maintenance must be performed with minimal interruption of system functions.

(g) Intermediate level maintenance will be performed by the using activity for TAOM peculiar items.

(3) Logistics Support. Repair parts, replacement modules, and systems requirements for normal field maintenance and combat losses will be accomplished through the existing logistical support system during the 1990-2000 period. Sufficient spares will be available at the organizational level to support the specified level of availability.

k. Emission Control. MIL-STD-461(A), TEMPEST, and the following emission control criteria must be met:

(1) Provisions for COMSEC devices are required for the encryption/decryption of all communications means.

(2) Radiating elements must be dispersed, yet centrally controlled, so as to permit effective operation of the overall system during EW or ARM attack while reducing the vulnerability of individual elements.

l. Human Engineering. The system must comply with the human engineering criteria specified by MIL-STD-1472.

5. INTRA/INTEROPERABILITY AND STANDARDIZATION REQUIREMENTS. The TAOM's shall interface as specified in the Technical Interface

Concepts (TIC) for the Marine Corps Tactical Systems. The major interfaces are as follows:

a. Other Marine Corps Agencies

b. Tactical Air Command Center (TACC)

c. Marine Air Traffic Control and Landing System (MATCALS)

d. Marine Integrated Fire and Air Support System (MIFASS)

e. Battery Command Posts (BCP)

f. Other TAOC(s)

g. Air Force Control and Reporting Center/Control and Reporting Post (CRC/CRP) and Message Processing Center

h. Army Air Defense Command Post (AADCP)

i. Naval Tactical Data System/Airborne Tactical Data System (NTDS/ATDS)

j. Aircraft

k. North Atlantic Treaty Organization (NATO) Air Defense Systems (ADS)

l. Airborne Warning and Control System (AWACS)

6. RELATED EFFORTS. The integrated command and control of the ground combat element, the aviation combat element and support elements which is characteristic of the MAGTF structure is unique to the Marine Corps. Consequently, the required operational capability for a system to command and control tactical air operations is different than the requirement of other services. The systems/programs identified below are related to the TAOM development in terms of mutual support and/or potential functional interface in the 1990 time frame:

a. Marine Corps

(1) Other MTS Systems

(a) Tactical Combat Operations System (TCO)

(b) MIFASS

(c) Marine Air-Ground Intelligence System (MAGIS)

(d) Tactical Warfare Simulation Evaluation and Analysis System (TWSEAS)

(2) MATCALS

(3) Landing Force Integrated Communication System (LFICS)

(4) Direct Air Support Center (DASC).

(5) Mobile Surface-to-Air Missile System (MSAMS)

(6) Radar Ground Directed Bombing System (RGDBS), AN/TPB-1D

b. Marine Corps/Army

(1) Position Location Reporting System (PLRS)

(2) Stinger Guided Missile System (STINGER)

(3) HAWK Phase III PIP Guided Missile System (HAWK)

(4) Lightweight Early Warning Detection Device (LEWDD)

c. Navy

(1) Navy Tactical Data System (NTDS)

(2) Airborne Tactical Data System (ATDS)

(3) Amphibious Flagship Data System (AFDS)

(4) Integrated Tactical Amphibious Warfare Data System (ITAWDS)

(5) Navy Aviation Logistics Command Information System (NALCOMIS)

d. Air Force

(1) Control and Reporting Center (CRC) and Control and Reporting Post (CRP), AN/TSQ-91

(2) TACC, AN/TSQ-92

(3) AWACS, E3A

(4) TACC Automation (MCE), 485L

(5) Ground Attack Control Central (GACC)

e. Army

(1) Army Air Defense Command Post (AADCP), AN/TSQ-73

(2) Patriot Missile System (SAM-D)

(3) Flight Operations Central (FOC)

(4) Roland Missile Fire Control System

(5) Shorad C2 System

f. Joint/Other

(1) Joint Search and Rescue Coordination Central (JSRCC)

(2) Special Intelligence System (SIS)

(3) Joint Tactical Information Distribution System (JTIDS)

(4) Joint Tactical Air Operations (JTAO)

(5) Navigation System Using Time and Ranging/Global Positioning System (NAVSTAR/GPS)

(6) NATO Integrated Command System (NICS/NACCS)

(7) Worldwide Military Command and Control System (WWMCCS)

(8) Joint Interoperability of Tactical Command and Control Systems (JINTACCS)

7. TECHNICAL FEASIBILITY AND ENERGY EFFECTIVENESS

a. Technical Feasibility. Initiation of acquisition of a TAOM developmental system during 1977/78 was feasible with no more than a low-to-moderate risk in any technical performance area. The required TAOM hardware technology is readily available within the industry today. The software performance requirements are considered to be the area of greater technical risk and the most demanding on the development contractor.

b. Energy Effectiveness. The reduction of power consumption for a TAOM from that used in the present systems (AN/TYQ-2/3A, ITAOC/TDCC) through the application of state-of-the-art technology, should result in a reduction in the system power requirements.

8. COST FORECAST. A cost estimate and cost forecast of the program costs was accomplished, based on the latest information available on quantity and types of equipment, and is shown in annex B.

9. MANPOWER REQUIREMENTS. Implementation of T/O No. 8630 to support the fielding of the AN/TYQ-23 will result in a reduction in the number of maintenance and an increase in the number of operational personnel. There are no changes projected to the number of support personnel.

10. TRAINING REQUIREMENTS. Operator and maintenance personnel will require a formal course of instruction on operational and maintenance procedures. The formal course will require similar assets as with existing ITAOC courses of instruction given by MCCES. The TAOM must include an on-line training and simulation capability which will be capable of functioning (without additional equipment) with or without simultaneous live operations to support on-the-job training, refresher training, team training, and integrated MACCS training.

11. AMPHIBIOUS/STRATEGIC LIFT IMPACT. Fielding of the TAOM will result in reduced amphibious shipping and airlift requirements. Weight and square footage comparisons between a TAOM equipped TAOC and a AN/TYQ-2 and AN/TYQ-3A equipped TAOC are shown below:

	TAOC (TAOM)		TAOC (AN/TYQ-2 AND 3A)	
	Weight	Sq.Ft.	Weight	Sq.Ft.
Shelters	67,768	640	113,979	2,353
Mobile Elec.	29,040	492	82,150	1,230
Radars	84,000	1,550	84,000	1,550
Radar Elec.	70,035	1,230	70,035	1,230
Total	250,843	3,912	350,164	6,363

ANNEX A

TAOC RAM CRITERIA

Attribute	Threshold	Goal
Reliability*	.881/190 hrs	.907/247 hrs
Availability		
A_i	.9987	.999
A_a	.955	.965
A_o	.90	.95
Maintainability		
$MTTR_o$	15 min	10 min
Cmt_o	30 min	20 min
$MTTR_i$	60 min	40 min
Cmt_i	120 min	80 min
Maintenance Ration		
Mission Failure	1:65	1:98
Up Equipment	1:6	1:9

Where:

A_i = inherent availability

A_a = achieved availability

A_o = operational availability

$MTTR_o$ = mean time to repair, organizational

$MTTR_i$ = mean time to repair, intermediate

Cmt_o = maximum allowable corrective maintenance time, organization

Cmt_i = maximum allowable corrective maintenance time, intermediate

*Operational MTBF. Only critical and essential failures are charged.

ANNEX B

RESEARCH AND DEVELOPMENT COSTS FOR AN/TYQ-23(V)1

IN THOUSANDS OF CONSTANT 1986 DOLLARS

DATE 12/18/86
TIME 08:34:15

LIFE CYCLE COST ELEMENTS STRUCTURE (BY LEVEL)	LEVEL 3	LEVEL 2	LEVEL 1	SUB ELEM	ELEM
110 DEMONSTRATION & VALIDATION					24159
120 FULL SCALE DEVELOPMENT					123675
TOTAL COSTS FOR RESEARCH AND DEVELOPMENT		REPORT USED:	2		147835

PRODUCTION COSTS FOR AN/TYQ-23(V)1

IN THOUSANDS OF CONSTANT 1986 DOLLARS

DATE 12/18/86
TIME 08:34:17

LIFE CYCLE COST ELEMENTS STRUCTURE (BY LEVEL)	LEVEL 3	LEVEL 2	LEVEL 1	SUB ELEM	ELEM
210 PRODUCTION (NON-RECURRING)					125489
211 CONTRACTOR				123891	
211.12 SYSTEM PROJECT MNGMNT		31748			
211.12.1 SYSTEM ENGINEERING	21638				
211.12.2 PROJECT MANAGEMENT	10109				
211.13 TRAINING		1262			
211.15 DATA		43852			
211.15.1 TECH ORDERS & MANUALS	5152				
211.15.2 ENGINEERING	38699				
211.16 INITIAL SPARES & REPAIR PARTS		16828			
211.17 SYSTEM TEST & EVAL SUPT		9519			
211.19 CONTRACTOR TECH SUPPORT		328			
211.20 OTHER		20353			
212 GOVERNMENT				1597	
212.12 INITIAL TRAINING		290			
212.13 SYSTEM TEST & EVALUATION		254			
212.13.2 OPRTNL TEST & EVAL(OT&E)	254				
212.17 INVENTORY MANAGEMENT		1053			
220 ELECTRONIC SYSTEM PRODUCTION (R)					333335
221 CONTRACTOR				301121	
221.11 PRIME MISSION EQUIP		294876			
221.11.1 TAOMs	257147				
221.11.3 TIGs	10430				
221.11.5 COMPUTER PROGRAMS	13230				
221.11.9 PECULIAR SUPPORT EQUIP	14067				
221.20 TRANSPORTATION		1233			
221.21 OTHER		5011			
222 GOVERNMENT				32214	
222.11 GOVT FURN EQUIP		15562			
222.11.1 INTEGRATION & ASSEMBLY	4548				
222.11.3 COMMUNICATIONS	192				
222.11.8 COMMON SUPPORT EQUIP	2417				
222.11.9 NAVY PROCURED COMSEC EQUIP	8403				
222.12 PROGRAM MANAGEMENT		16652			
222.12.1 PROGRAM MANAGEMENT MILITARY	1672				
222.12.2 PROGRAM MANAGEMENT CIVILIAN	810				
222.12.3 PGM MNGMNT CONTRACTOR SUPT	13842				
TOTAL COSTS FOR PRODUCTION		REPORT USED:	2		458824

OPERATIONS AND SUPPORT COSTS FOR AN/TYQ-23(V)1

THOUSANDS OF CONSTANT 1986 DOLLARS

DATE 12/18/86
TIME 08:34:20

LIFE CYCLE COST ELEMENTS STRUCTURE (BY LEVEL)	LEVEL 3	LEVEL 2	LEVEL 1	SUB ELEM	ELEM
310 OPERATIONS					738713
311 OPERATOR PERSONNEL				712332	
311.1 CREW			340942		
311.1.1 MILITARY CREW		340942			
BASE PAY AND ALLOWANCES	199614				
REPLACEMENT TRAINING	36185				
HEALTH CARE	9052				
PERM CHANGE OF STATION	13274				
RETIREMENT	46891				
TRANS,PRIS,PATIENTS	4688				
BASE OPERATING SUPT	31235				
311.2 INDIRECT PERSONNEL			371390		
311.2.1 MILITARY INDIRECT		371390			
BASE PAY AND ALLOWANCES	234201				
REPLACEMENT TRAINING	9014				
HEALTH CARE	12830				
PERM CHANGE OF STATION	14963				
RETIREMENT	49358				
TRANS,PRIS,PATIENTS	6751				
BASE OPERATING SUPT	44270				
312 MATERIAL CONSUMPTION				269	
312.3 OTHER MATERIAL			269		
313 ENERGY CONSUMPTION				22490	
313.1 FUEL			18601		
313.2 ELECTRIC POWER			3888		
314 OPERATIONAL FACILITIES				3620	
314.1 FACILITY MAINTENANCE			3620		
320 MAINTENANCE					389305
321 ORGANIZATIONAL MAINTENANCE				369	
321.2 MAINT MATERIAL			369		
321.2.2 REPAIR MATERIAL		369			
322 INTERMEDIATE MAINTENANCE				156030	
322.1 INTER MAINT PERSONNEL			134863		
322.1.1 MILITARY MAINT PERS		134863			
BASE PAY AND ALLOWANCES	76181				
REPLACEMENT TRAINING	17077				
HEALTH CARE	4456				
PERM CHANGE OF STATION	5039				
RETIREMENT	14402				
TRANS,PRIS,PATIENTS	2328				
BASE OPERATING SUPT	15377				
322.2 MAINT MATERIAL			21132		
322.2.1 DISCARDED REPARABLES		5667			
322.2.2 REPAIR MATERIAL		15465			
322.3 TRANSPORTATION			34		
323 DEPOT REPAIR				6779	

OPERATIONS AND SUPPORT COSTS FOR AN/TYQ-23(V)1

IN THOUSANDS OF CONSTANT 1986 DOLLARS

DATE 12/18/86
TIME 08:34:23

LIFE CYCLE COST ELEMENTS STRUCTURE (BY LEVEL)	LEVEL 3	LEVEL 2	LEVEL 1	SUB ELEM	ELEM
323.1 LABOR			3005		
323.2 MATERIAL			3260		
323.3 TRANSPORTATION			513		
323.3.2 TRANSPORTATION		513			
324 DEPOT OVERHAUL				197244	
324.2 MATERIAL CHARGES			196371		
324.3 TRANSPORTATION			873		
325 OPER SOFTWARE SUPPORT				14753	
325.1 SOFTWARE MAINT PERSONNEL			14295		
325.1.2 CIVILIAN S/W PERS P&A		14295			
325.3 CONTRACT S/W MAINTENANCE			457		
326 MAINT SOFTWARE SUPPORT				515	
326.3 CONTRACT S/W MAINTENANCE			515		
327 CONTRACT MAINTENANCE				350	
328 REPLACEMENT EQUIPment				13263	
328.2 LIFE REPLACEMENTS			13244		
328.3 TRANSPORTATION			18		
340 SUPPLY SUPPORT					78814
343 INVENTORY ADMINISTRATION				78814	
343.1 INVENTORY MANAGEMENT			21078		
343.2 INVENTORY DIST/HOLDING			57735		
350 TECH DATA REVISIONS					4003
TOTAL COSTS FOR OPERATIONS AND SUPPORT	REPORT USED:		2		1210837
TOTAL LIFE CYCLE COSTS					1817496

END

4-87

DTIC

AD-A177 980 REQUIRED OPERATIONAL CAPABILITY (ROC) NO CCC 128C FOR THE TACTICAL AIR OPERATIONS MODULE REVISION(U) MARINE CORPS WASHINGTON DC F X CHAMBERS 09 FEB 87 2/2

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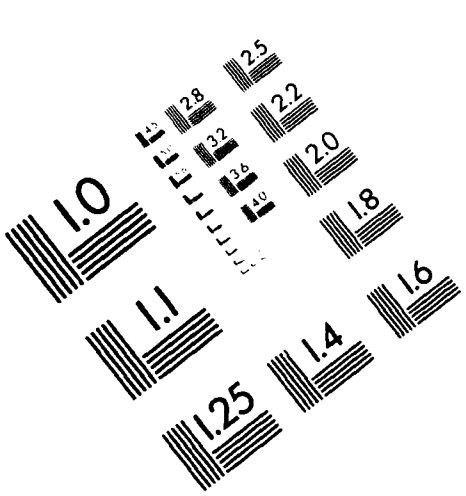

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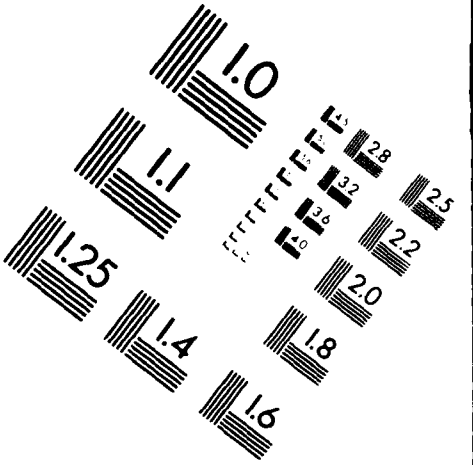

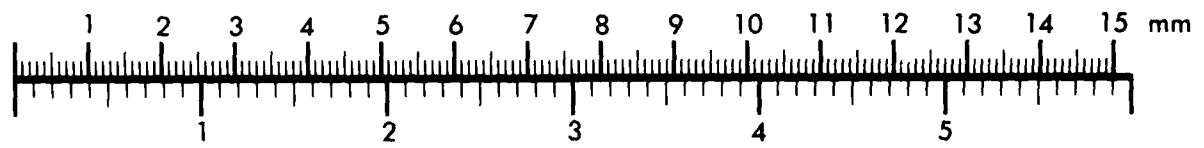

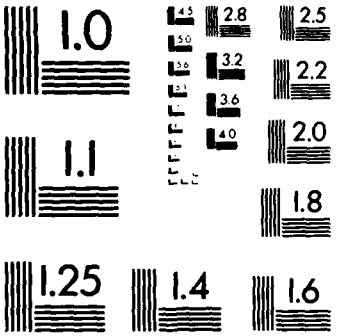

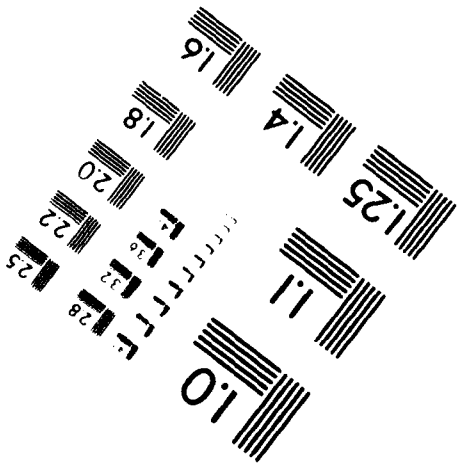

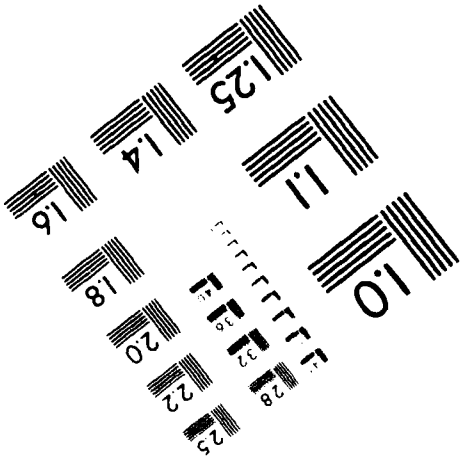

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INFORMATION

UNITED STATES MARINE CORPS
MARINE CORPS COMBAT DEVELOPMENT COMMAND
QUANTICO, VIRGINIA 22134-5001

IN REPLY REFER TO:
3900
C 44

NOV 0 5 1993

From: Commanding General, Marine Corps Combat Development Command, 2042 Broadway Street, Suite 3, Quantico, Virginia 22134-5021

Subj: REVISED REQUIRED OPERATIONAL CAPABILITY (ROC) (NO. CCC 1.28C) FOR THE TACTICAL AIR OPERATIONS MODULE; CHANGE 1

Ref: (a) MCO 3900.4D

1. Purpose. To transmit pen changes to the basic ROC. Per the reference, the following changes to the Revised ROC (NO. CCC 1.28C) for the Tactical Air Operations Module are approved.

2. Action

a. Paragraphs 4a (3d sentence) and 4b(3) (1st and 3d sentence) replace "Tactical Air Commander (TAC)" with "Air Combat Element (ACE) commander".

b. Paragraph 4b(1) add the following subparagraphs:

"(l) Provide access to displays and communications for the Sector Antiair Warfare Coordinator (SAAWC) and his battle staff.

(m) To forward Ballistic Missile (BM) tracks to surface-to-air missile fire units, and to provide the joint interface for the correlation (reporting responsiblity) and exchange of TBM information."

c. Paragraph 4b(2) (1st sentence) replace with the following: "The TAOM will be packaged in a standard Marine Corps shelter and will be transportable by standard tactical means including helicopter, truck, mobilizer, ship, and fixed wing aircraft."

d. Paragraph 4b(3) (after the 3d sentence) add the following: "When the functions of the SAAWC are required, an organic SAAWC facility will be employed to interface with the TAOMs which enables the SAAWC and his battle staff to perform AAW supervisory tasks."

e. Paragraph 4d (2d sentence) replace with the following "...(4) on/off load from prime movers by material handling equipment (MHE), and (5) on/off load from transport aircraft and movement over improved surfaces using mobilizers organic to the Fleet Marine Force."

f. Paragraph 5 (1st sentence) replace with the following: "The TAOMs shall interface as specified in the MAGTF Interoperability Requirements Concepts (MIRC)."

g. Paragraph 5d replace with the following: "d. Joint Tactical Information Distribution System (JTIDS)."

h. Paragraph 5 add the following: "m. Joint Interoperability of Tactical Command and Control Systems (JINTACCS)."

i. Paragraph 6a replace with the following:

"a. Marine Corps

(1) Tactical Combat Operations System (TCO)

(2) Intelligence Analysis System (IAS)

(3) Tactical Warfare Simulation and Evaluation Analysis System (TWSEAS)

(4) Hybrid Mobile Direct Air Support Central (HMDASC)

(5) Replacement Air Mobile Direct Air Support Central (RAMDASC)

(6) Ground Based Air Defense Fire Unit Command and Control System (GBADFUCCS)"

j. Paragraph 6c(3) replace with the following: "(3) Joint Maritime Command Information System (JMCIS)"

k. Delete paragraph 6c(4).

l. Paragraph 6d add the following: "(6) Contingency Theater Air Control System (TACS) Automated Planning System (CTAPS)"

Subj: REVISED REQUIRED OPERATIONAL CAPABILITY (ROC) (NO. CCC 1.28C) FOR THE TACTICAL AIR OPERATIONS MODULE; CHANGE 1

m. Paragraph 6f(3) replace with the following: "(3) Tactical Intelligence Broadcasts (TIBS)/Tactical and Related Applications (TRAP) as required to support the Ballistic Missile Defense (BMD)."

n. Delete paragraph 6f(8).

3. Filing Instructions. This change transmittal will be filed immediately following the signature page of the basic ROC.

R. E. APPLETON
By direction

Distribution:
See attached

END

FILMED

DATE: 12-93

DTIC